Abstract

An improved battery powered four-wheel multi-speed all electric vehicle, used to move personnel and power by two multi-wound electric motors connected in tandem so that by engaging the controls three speeds may be achieved. The forward and reverse of the vehicle is accomplished by moving a forward and reverse switch before starting the vehicle by engaging the operating switch. The electrical supply for the vehicle is furnished by batteries charged by a standby rectifier when vehicle is not in use, and with solar panel and fuel cell interfacing during daytime operation.

Background of the Invention

The specific field of this invention is an **all-electric car**, resembling the size and shape of most of the modern cars and other contemporary vehicles. There is presently no method in the art which would allow for the higher speed as our vehicle and the low current consuming characteristics make our invention very desirable in solving the pollution problem and is environmentally very sound and the fuel supply problem does not exist with our invention.

Summary of the Invention

Our invention is a battery powered multi speed four wheeled vehicle capable of carrying passengers for greater distance than that previously practiced in the arts; indeed, the nonpolluting advantage of this invention outweighs those of competing vehicles powered by engines consuming diesel or gasoline.

Brief Description of the Drawings

The accompanying drawings show an embodiment of our invention and modification of a side view of the longitudinal Section and a back elevation view of that section.

The longitudinal view shows the two motors connected with three manually adjustable plates. The batteries and the motors are supported by channel iron/steel.

A schematic drawing (**Fig. 3**) showing connection and interconnection showing the rectifier (9), selector switch (10), three pole disconnect switch (11), battery (12), fuel cell (~3), polarized receptacle (14), polarized attachment cap (15), forward and reverse switch (16).

The drawing in **Fig. 4** show a three position **low**, **medium**, and **high** speed with normally closed and normally open interlocks contained in the transition relay 13.

The drawing at **Fig. 5** show the interlocking at the three speed position~ repeating the interlocking shown on drawing on **Fig 4** with the symbols list defining the components on the Fig. 5 drawing.

Description of the Embodiment

For a better understanding of the nature and object of our invention reference be taken of the following detailed description of the drawing of the embodiment.

Fig.1 shows two motors (1) and (2) mounted in tandem with three connecting plates and a mounting channel (7) common to both motors I and 2 and the batteries (3) mounted above the motors. This view indicates a two wheel and four wheel drive configuration by adjustments to the manually adjustmentplates. **Fig. 2** is a side view of **Fig.1** and shows two motors mounted in tandem with a shaft and three connecting plates 4, 5 and 6. Two banks of batteries (3) mounted on a supporting channel bolted directly to the chassis of the vehicle. A solar panel (8) shown on top of the roof of the vehicle, and **Fig. 3** is a schematic of the control system setting with a

rectifier (9) connected by a polarized receptacle (14) with a polarized cap (15). A solar panel (8) is shown hard wire connected to Bus L1 and L2 and a selector switch (10), which connects into the transition relay (13) and a forward-reverse switch (16).

Fig. 4 shows interlocking contacts within the transition relay (13) with the **normally opened** or **closed** interlocks (N.O.)(N.C.). Controlling the system is shown in **Fig. 5.**

Fig. 5 is a schematic diagram showing three positions: position I (low speed); position 2 (medium speed), position 3 (high speed) with the closing of LI-L2 switch (11) the position I (low speed) is accomplished through the N.C. (I) the N.C. (3) and the NC. (5) interlocks, which will energize the motor contractors Ml and M2 Upon changing the selector switch (10) to "medium" position (2), motor contractors Ml and M2 are energized through N.C. (6), N.O. (7) and N 0 (9) and NC (10). Upon changing the selector switch to "high speed" position (3) M1 and M2 are re-energized through N.C.(11) N.C. (12) and N.O.(15) N.C.(16) and with the closing of the N.O.(13) and N.O.(17) interlocks the shunt fields are thus energized. The direction of the movement of the vehicle is controlled by the position of the switch 16.

Sequence of Manual Operation

Position I

The closing of the two pole switch Ll-L2, and placing the selector switch in the manual **"low"** position will cause motor contactors Ml and M2 to become energized through the normally closed (N.C.) interlocks 1, 3 and 5, hence the two series motors are connected in a series connection .

Position 2

To reach a **higher medium speed,** from the number I **lower speed** position, move the selector switch to the **"medium"** speed position re-energizing motor contactors M1 and M2 through the normally closed interlocks 6 and 10 and the normally open interlocks 7 and 9, hence two series motors connected in parallel.

Position 3

To reach a **higher speed,** from the **medium speed** position, the selector switch is moved to the **"high"** position re-energizing motor contactors Ml and M2 through the following normally closed interlocks: 11, 14 and 16; and, the following normally open interlocks 12, 13, 15 and 17, and energizing the shunt fields in both Ml and M2 thus changing these two motors to compound motors which remain in a parallel connection.

Sequence of Automatic Operation

Position 1

The closing of the two pole switch LI-L2, and placing the selector switch in the automatic position, energizes the transition relay "TR" causing motor contactors Ml and M2 to become energized through the normally closed (N.C.) interlocks 1, 3, and 6, hence the two series motors are connected in the series connection.

Position 2

Since the increase in the speed of the vehicle causes an increase in voltage to the transition relay (13), when the voltage reaches a given setting, the relay will pick-up and energize motor contactors Ml and M2 in a **medium** speed position. as heretofore described in the **manual** operation.

Position 3

When the vehicle has reached a pre-determined **higher speed** the transition relay will again operate into the higher mode energizing motor contactors Ml and M2 in a highest speed mode with motors Ml and M2 in the faster speed mode characteristic of compound motors, which remain in the parallel connection .